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DDS&T-486-66

**USAF review(s)
completed.**

2 March 1966

MEMORANDUM FOR: Deputy Director for Science and Technology

SUBJECT: Interdiction of Supply Routes from North
Vietnam to South Vietnam by Means of
Aerial Implaced Mines

1. A brief staff study has been performed with the objective of assessing the feasibility of interdicting the flow of materiel from North Vietnam to South Vietnam by employing aerial implaced mines. This paper presents a summary of this investigation along with some of the salient features of the problem. The initial phase of the investigation was focused on interdicting Route 12/15 which currently carries the majority of the materiel from North Vietnam to various Laotian transshipment points. Route 12/15 is an all weather truck road which passes into Laos from North Vietnam through the Mu Gia Pass. The 5 NM stretch through the Mu Gia Pass and a 10 NM stretch of road immediately to the north of the Pass transverses particularly rugged terrain and, therefore, is attractive as a potential choke point.

2. An important consideration in examining the feasibility and utility of interdicting the Mu Gia Pass area is the relatively low rate of flow of materiel along this route. The maximum rate of flow observed to date has been about 80 tons per month. It has been estimated that about 250 personnel, including porters and their associated support, or one to three trucks can maintain an 80 ton per month flow along the 15 NM stretch of road in question.

3. For the case of bombs fused for maximum road cratering, the study has led to the conclusion that 7 to 12 good weather sorties per day would result in a damage level requiring about 250 personnel

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to maintain the road in useable condition for truck traffic. A higher damage level would simply make it more attractive for the North Vietnamese to exercise the portage option rather than employ larger numbers of personnel for road maintenance. This approach, therefore, would not significantly attenuate the flow of materiel. This result is based on the assumption of low level tactical bombing yielding a weapon CEP of 220 feet. Under adverse weather conditions a means of precise navigation must be available in order to maintain a comparable level of effectiveness. The LORAN D installation, soon to be operational, should make possible navigation sufficiently accurate to prevent gross performance degradation.

4. In addition to the case considered above, the cost-effectiveness of the use of the FMU-30 fuse has been examined for this mission. The FMU-30 fuse can be employed with the standard iron bombs and effectively converts these weapons to aerial laid land mines. The FMU-30 fuse is a sophisticated pressure sensitive fuse incorporating both counting and discrimination features which optimize its effectiveness against vehicular traffic. Since the only effective way of disposing of a bomb incorporating the FMU-30 fuse is to detonate the weapon, the ultimate effect in terms of road cratering is identical to that resulting from using the same weapon with a standard fuse. However, FMU-30 fuse requires a careful search of the road and the immediate adjacent area to locate and detonate the devices before repair operations can begin. Even though this clearly complicates the situation for the North Vietnamese, it has been concluded that use of the FMU-30 fuse does not appear to be an attractive option for this application. This follows from the relatively high cost of the fuse (about a factor of 10 more expensive than a standard fuse such as the M904) and the relative ease with which the weapon can be located by ground inspection.

5. The above considerations lead to the conclusion that road interdiction to vehicular traffic in the Mu Gia Pass area is not likely to significantly impede the flow of materiel. What is

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required is the means of preventing the passage of personnel from North Vietnam into Laos. One approach to this problem is the deployment of dense anti-personnel mine fields. No such munition is currently carried in the arsenal, but there are several different types of small, relatively inexpensive, aerial deployed anti-personnel mines under development. The Wide Area Trip Wire Mine under development by the Air Force is particularly attractive for this application. Area denial of the Mu Gia Pass by itself is not likely to be an adequate measure. As the level of mining increases it soon becomes more attractive for the North Vietnamese to avoid the Mu Gia Pass altogether and transport supplies via cross-country routes into Laos. This would raise the level of effort required by the North Vietnamese from a few hundred porters to perhaps a few thousand but probably would not seriously hinder the flow of materiel at the relatively low rate of 80 tons per month.

6. In view of this consideration it becomes necessary to deploy anti-personnel mine fields over large areas. An anti-personnel mine field extending from the Mu Gia Pass south along the North Vietnamese/Laotian frontier to the 17th parallel would be 60 miles in length. Laying a mine field one mile deep and 60 miles long would require 16 to 17 B-52 sorties and about 875,000 mines. The cost of this ordnance is estimated at \$10,500,000.

7. The Wide Area Trip Wire Mine as it is currently configured self-destructs in 144 hours. Therefore, at a minimum the entire mine field must be replaced 1.17 times per week requiring about 19 B-52 sorties. The ordnance cost to support this operation is \$12,400,000 a week or an annual expense of \$645,000,000 not including the B-52 operating costs.

8. A brief examination of the suitability of B-52's for this mission has been made. The problem of achieving sufficient navigational accuracy to insure uniform mine deployment does

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not appear to be insurmountable. Use of LORAN D or ship based TACAN will in all likelihood prove adequate. The mines can be packaged in the SUU-34 (Hayes) dispenser, two of which can be carried in the B-52 bomb bay.

9. To breach a mine field of the density described at one point requires that the North Vietnamese find and disable 110 to 140 mines. If this can be done in less than 144 hours, then the entire mine field must be replaced at a higher rate than assumed above or alternatively made either deeper or denser. Both of these possibilities will significantly increase the total operating costs. If, on the other hand, a longer time is required on the average to breach the mine field, the cost could be reduced by increasing mine self-destruct time or by simply laying a shallower field. It is difficult to estimate the time required to breach a mine field of the type described. It does not seem likely, however, that this time will be much greater than the 1.1 hours per mine which led to the above cost estimates.

10. In addition to area denial to personnel, all available roads across the frontier must be effectively interdicted. As past experience has demonstrated, interdicting roads with conventional bombs in the face of a determined maintenance operation is most difficult. However, the employment of mining techniques should prove much more effective. A detailed study of utilization tactics has not been made, but it is clear that a mix of anti-personnel mines, small anti-tank mines (also under development), and large FMU-30 fused bombs will be required. The anti-personnel mines will greatly complicate the road clearing operation while the larger mines and bombs will result in a high attrition rate if the roads are not carefully cleaned.

11. In summary, the conclusions of this study are:

A. There is no air dropped munition in the inventory which can significantly attenuate the flow of materiel from North to South Vietnam as long as the rates are as low as 80 tons per month.

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B. At materiel flow rates of 80 tons per month and below, the interdiction of roads to truck traffic by itself is not likely to be effective. In addition to interdicting roads, large areas must be denied to foot traffic.

C. Anti-personnel mines now under development will provide a greatly increased capability for area denial. The use of these mines for the denial of large areas to personnel and to impede the sweeping of influence mines placed in the vicinity of roads shows promise of achieving a significant diminution of the 80 tons per month materiel flow rate assumed. Based upon current cost data, the munitions used would cost on the order of \$645,000,000 per year and require 19 B-52 sorties per week.

It should be recognized that the cost figure is an estimate which could be in error by a significant percentage. A study in depth supported by field experimentation will be required to arrive at a more precise determination of costs and effectiveness.



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